Carl Zeiss Jena GmbH
Attorney's File: PAT 1250/127-PCT

Claims

1. A multi-photon luminescence microscope (M) with an excitation beam path comprising an objective (2) which focuses excitation radiation (1) in a focal point (4) in the sample (5), a scanning unit which shifts the focal point (4) at least one-dimensionally, and a detecting unit which picks up luminescence radiation stimulated by multi-photon excitation in the sample, **characterized in that** the detecting unit comprises an area detector (9) which is located on the side of the sample (5) opposite the objective (2).

2. The microscope as claimed in Claim 1, characterized in that the area detector (9) is spaced apart from the focal point (4) by a distance (d) which is small as compared to the extent (b) of the area detector (9) in order to cover as large a space angle (K) as possible.

3. The microscope as claimed in any one of the above Claims, characterized in that a preferably holographic grating (8) is arranged between the area detector (9) and the sample (5).

4. The microscope as claimed in Claim 3, characterized in that the grating (8) is applied to the bottom surface of a sample carrier (7).

5. The microscope as claimed in any one of the above Claims, characterized by a spatially resolving area detector (9).

6. The microscope as claimed in Claim 5, characterized by a CCD area detector (9), preferably as a back-illuminated CCD sensor.

7. Method of multi-photon luminescence microscopy, wherein excitation radiation (1) is focused in a focal point (4) located in a sample (5), whereby luminescence radiation is stimulated by multi-photon excitation in the sample (5), wherein for scanning the sample (5) the focal point (4) is shifted, and the luminescence radiation is detected, **characterized in that** the

luminescence radiation on the side located opposite the irradiation of the excitation radiation is detected in a flat-spread manner.

8. The method as claimed in Claim 7, characterized in that spectral dispersion of the luminescence radiation is effected prior to detection.